

**REMARKS**

Claims 1-22 were pending in this application.

Claims 1-22 have been rejected.

Reconsideration and full allowance of Claims 1-22 are respectfully requested.

**I. REJECTION UNDER 35 U.S.C. § 103**

The Office Action rejects Claims 1-6, 11-16, 21 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Applicant Admitted Prior Art (“*APA*”) in view of U.S. Patent No. 5,150,121 to Newell et al. (“*Newell*”). The Office Action rejects Claims 7, 8, 17, and 18 under 35 U.S.C. § 103(a) as being unpatentable over *APA* and *Newell* in further view of U.S. Patent 5,377,225 to Davis (“*Davis*”) and in further view of U. S. Patent Publication No. 2003/0031273 to Mohindra (“*Mohindra*”). These rejections are respectfully traversed.

In *ex parte* examination of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. (*MPEP* § 2142; *In re Fritch*, 972 F.2d 1260, 1262, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992)). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 U.S.P.Q. 785, 788 (Fed. Cir. 1984)). Only when a *prima facie* case of obviousness is established does the burden shift to the Applicant to produce evidence of nonobviousness. (*MPEP* § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993)). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the Applicant is entitled to grant of a patent. (*In re Oetiker*, 977 F.2d 1443,

1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 U.S.P.Q. 870, 873 (Fed. Cir. 1985)).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. (*In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993)). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. (MPEP § 2142).

*APA* recites a mixer 120A that mixes a local oscillator (LO) reference signal and a radio frequency (RF) signal to produce a down-converted baseband signal. (*Application*, Page 3, Lines 18-21). The LO reference signal is provided by a sine and cosine generator 110, which generates the LO reference signal using an LO reference frequency signal. (*Application*, Page 3, Lines 7-11).

As acknowledged in the Office Action, *APA* lacks any mention of a "local oscillator (LO) circuit" capable of receiving a "local oscillator (LO) reference signal" and a "double sideband (DSB) clock signal" as recited in Claims 1 and 11. *APA* also lacks any mention that the "local oscillator (LO) circuit" is capable of generating an "in-phase product signal" in which a "polarity" of the "LO reference signal" is reversed at a "DSB frequency" of the "DSB clock

signal” as recited in Claims 1 and 11. The Office Action asserts that Figure 2 of *Newell* discloses these elements and that it would be obvious to modify *APA* with *Newell*.

Figure 2 of *Newell* illustrates a system for demodulating an in-phase component of a baseband signal using a frequency-encoded version of a double-sideband suppressed-carrier (DSB-SC) signal. (*Col. 3, Lines 7-12*). A modulator 34 receives a baseband signal and a reference-carrier signal on a signal line 36 from a reference-carrier frequency source 38. (*Col. 4, Lines 44-54*). The modulator 34 may, for example, multiply the baseband signal and the reference-carrier signal to produce a low-level DSB-SC output signal. (*Col. 4, Lines 50-56*). The output of the modulator 34 is processed by additional components (including a voltage-to-frequency converter 54) to produce output signal pulses at terminal 56. (*Col. 4, Line 63 – Col. 5, Line 22*). An up-down frequency counter 58 counts the output signal pulses, and the counter 58 counts up or down depending on the reference-carrier signal from the reference-carrier frequency source 38. (*Col. 5, Lines 22-38*). The output of the counter 58 may include digital words that represent an integral of an originally encoded baseband signal. (*Col. 5, Lines 43-50*).

Presumably, the Office Action relies on the reference-carrier signal from the reference-carrier frequency source 38 of *Newell* as representing the “local oscillator (LO) reference signal” recited in Claims 1 and 11. Only two components in Figure 2 of *Newell* receive the reference-carrier signal, the modulator 34 and the counter 58.

The modulator 34 of *Newell* receives a baseband signal and the reference-carrier signal from the reference-carrier frequency source 38. The modulator 34 produces a low-level DSB-SC output signal. However, nothing in *Newell* indicates that the output of the modulator 34 (the low-level DSB-SC output signal) represents a signal in which a polarity of the reference-carrier

signal from the reference-carrier frequency source 38 is reversed at a frequency of the baseband signal. As a result, the modulator 34 of *Newell* cannot disclose, teach, or suggest a “local oscillator (LO) circuit” capable of receiving a “local oscillator (LO) reference signal” and a “double sideband (DSB) clock signal” and generating therefrom an “in-phase product signal” in which a “polarity” of the LO reference signal is reversed at a “DSB frequency” of the “DSB clock signal” as recited in Claims 1 and 11 and similarly in Claim 21.

The counter 58 of *Newell* receives output signal pulses from the voltage-to-frequency converter 54 and the reference-carrier signal from the reference-carrier frequency source 38. The counter 58 generates digital words representing an integral of a baseband signal. However, nothing in *Newell* indicates that the output of the counter 58 (the digital words) represents a signal in which a polarity of the reference-carrier signal from the reference-carrier frequency source 38 is reversed at a frequency of the output signal pulses from the voltage-to-frequency converter 54. *Newell* simply recites that the counter 58 counts up or down depending on the polarity of the reference-carrier signal from the reference-carrier frequency source 38. Nothing in *Newell* indicates that the counter 58 is reversing the polarity of the reference-carrier signal from the reference-carrier frequency source 38 or that this reversing is based on a frequency of the output signal pulses from the voltage-to-frequency converter 54. As a result, and as the Examiner now concedes, the counter 58 of *Newell* cannot disclose, teach, or suggest a “local oscillator (LO) circuit” capable of receiving a “local oscillator (LO) reference signal” and a “double sideband (DSB) clock signal” and generating therefrom an “in-phase product signal” in which a “polarity” of the LO reference signal is reversed at a “DSB frequency” of the “DSB clock signal” as recited in Claims 1 and 11 and similarly in Claim 21.

The Examiner defines the “reference signal” in section 3 as local oscillator (LO) reference signal 38 of *Newell*’s Figure 2 (which *Newell* labels as “reference frequency source”). *Newell* clearly teaches that the “reference-frequency signal from the source 48 is applied to the up/down control terminal 60 of the counter 58 to change the direction of the count depending on the polarity of the reference-frequency signal”. That is, the direction of the counter depends on the polarity of the reference signal. Nothing in *Newell* teaches or suggests that the polarity of LO reference signal 38 is effected by anything. Certainly nothing in *Newell* teaches or suggests that the DSB-SC signal effects the polarity of the LO reference signal at the output of counter 58 at all. While a single bit of the output of the counter may be seen to “oscillate” as the count increases or decreases, it does so independently of the polarity of the LO reference signal.

The specific limitation of Claims 1 and 11 requires “an in-phase product signal in which a polarity of said LO reference signal is reversed at said DSB frequency of said DSB clock signal”. The Examiner defines the “in-phase product signal” as “34”, evidently referring to *Newell*’s DSB-DC modulator 34. As the Examiner now concedes, *Newell* simply doesn’t teach that the output of DSB-DC modulator 34 is a “signal in which a polarity of said LO reference signal is reversed at said DSB frequency of said DSB clock signal.”

The Examiner now states that “Davis discloses generating an in-phase product signal of said LO reference signal and said DSB clock signal in which a polarity of said LO reference signal is reversed at said DSB frequency of said DSB clock signal (col. 1, lines 44-49, col. 7, line 7-46, col. 9, lines 6-63, col. 14, lines 8-34, col. 19, lines 60-68 – col. 20, lines 1-6, col. 22, lines 24-39).” Here, the Examiner cites to 162 lines of *Davis* without making any effort to show what she considers to be the claimed LO reference signal, the claimed DSB clock signal, and the

claimed in-phase product signal. The various portions of *Davis* cited by the Examiner discuss, alternately, a chip waveform 23, spreading code, a digital waveform 20, a transmitted waveform, a signature waveform 21, a direct sequence spread waveform 22, a basic clock signal from oscillator 26, an information bearing signal 20, a combined signal, a resulting signal, an RF signal, an output signal 107, a reference signal  $h2[i]$ , a signal  $h2(t)$ , a first signal, a second signal, a tap weight signal  $a_n$ , a set of tap weight signals  $a_j$ , a tap point signal, a sum signal, an integrated signal, a series of first product signals, a series of second product signals, and a series of difference signals. None of these signals or combinations of them meet the limitations of the claims.

So that the Examiner's concerns can be fully addressed before appeal, the Examiner in cordially requested to identify specifically which signals in *Davis* she believes corresponds to the claimed LO reference signal, the claimed DSB clock signal, and the claimed in-phase product signal, and specifically where she believes that *Davis* teaches generating an in-phase product signal from a DSB clock signal in which a polarity of said LO reference signal is reversed at said DSB frequency of said DSB clock signal.

The only oscillator disclosed by *Davis* is the local oscillator 26. The signal from local oscillator 26 is not taught or suggested by *Davis* as used for generating an in-phase product signal from a DSB clock signal in which a polarity of said LO reference signal is reversed at said DSB frequency of said DSB clock signal. The only DSB signal taught by *Davis* appears to be in a conventional RF modulator circuit 48, which is not related at all to the local oscillator 26.

As neither *APA*, *Newell*, *Davis*, nor any combination of them teach or suggest this limitation of the independent claims, and since *Mohindra* similarly fails to teach this limitation, all rejections are traversed.

In addition, Claims 1 and 11 recite that a “radio frequency (RF) mixer” has an “input port” capable of receiving an “in-phase product signal,” which is produced by a “local oscillator (LO) circuit.” In order to reject Claims 1 and 11, the Office Action must show that the output of the circuit in Figure 2 of *Newell* (the alleged “local oscillator (LO) circuit”) would be provided to the mixer 120A of *APA*. The Office Action cannot make this showing.

The output of the counter 58 in *Newell* represents an integral of a baseband signal, which is generated using the baseband signal. The purpose of the circuit in Figure 1 of *APA* is to generate a baseband signal (I-channel and Q-channel baseband signals) using a radio frequency signal. The Office Action has to show that it is obvious to use the output of the circuit in Figure 2 of *Newell* (where the output contains digital words representing a recovered baseband signal) as an input to the mixer 120A of *APA* (which is used to recover a baseband signal). In other words, the Office Action has to show that a person skilled in the art would provide digital words representing a recovered baseband signal to a mixer so that the mixer can recover the baseband signal. A person skilled in the art would clearly not use a recovered baseband signal from the circuit in Figure 2 of *Newell* in order to recover the baseband signal in *APA*. Such a modification would require that the same baseband signal be recovered twice, and is not taught or suggested by any art of reference, alone or in combination, and there is certainly no motivation for one of skill in the art to make such a modification.

As the Examiner is surely aware, the motivation to combine or modify must be specific to the actual teachings sought to be combined. "In holding an invention obvious in view of a combination of references, there must be some suggestion, motivation, or teaching in the prior art that would have led a person of ordinary skill in the art to select the references and combine them in the way that would produce the claimed invention." (Karsten Mfg. Corp. v. Cleveland Golf Co., 242 F.3d 1376, 1385 (Fed. Cir. 2001) emphasis added). "When the references are in the same field as that of the applicant's invention, knowledge thereof is presumed. However, the test of whether it would have been obvious to select specific teachings and combine them as did the applicant must still be met by identification of some suggestion, teaching, or motivation in the prior art, arising from what the prior art would have taught a person of ordinary skill in the field of the invention." (In re Dance, 160 F.3d 1339, 1343 (Fed. Cir. 1998), emphasis added).

The specific combinations and modifications suggested by the Examiner are not supported by any specific motivation in the art at all, and so cannot be properly made.

For these reasons, the Office Action has not established that the proposed *APA-Newell-Davis-Mohindra* combination discloses, teaches, or suggests the Applicants' invention as recited in Claims 1, 11 and 21 (and their dependent claims). Accordingly, the Applicants respectfully request withdrawal of the § 103 rejection and full allowance of Claims 1-22.

## II. CONCLUSION

The Applicants respectfully assert that all pending claims in this application are in condition for allowance and respectfully request full allowance of the claims.



SUMMARY

As a result of the foregoing, the Applicant asserts that the remaining Claims in the Application are in condition for allowance, and respectfully requests an early allowance of such Claims.

If any issues arise, or if the Examiner has any suggestions for expediting allowance of this Application, the Applicant respectfully invites the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@munckbutrus.com*.

The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

MUNCK BUTRUS, P.C.

Date:

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P.O. Drawer 800889

Dallas, Texas 75380

Phone: (972) 628-3600

Fax: (972) 628-3616

E-mail: *wmunck@munckbutrus.com*



William A. Munck

Registration No. 39,308